Challenger

model MC-5A intercity coach

operator's manual

TO THE DRIVER

This manual has been prepared to give you the necessary information to successfully operate the CHALLENGER MODEL MC-5A Intercity Coach.

To obtain the most satisfactory coach performance and assure your passengers of maximum safety and comfort, complete knowledge of your coach and its correct operating practice is important.

This manual contains information useful in normal operation or when emergencies or abnormal conditions occur. Any malfunction which interferes with satisfactory operation of the coach should be reported to responsible service personnel for immediate attention, particularly if safety may be affected.

DRIVING CONTROLS

All hand and foot controls used in the normal operation of the coach, and all gauges, tell-tale lights and switches are located in the driver's compartment. They are so arranged as to be conveniently reached by you while in the driver's seat.

These, as well as other controls and equipment which you may need to use under abnormal or emergency conditions, are described and illustrated throughout this manual.

Information is included concerning minor service and maintenance procedures with which you should be familiar.

MOTOR COACH INDUSTRIES, INC.
PEMBINA □ NORTH DAKOTA □ U.S.A.

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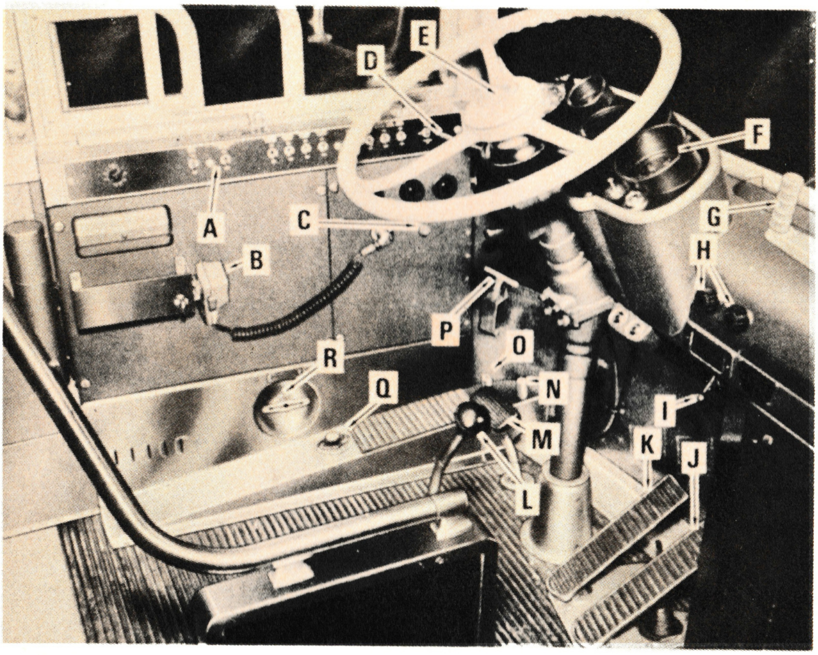
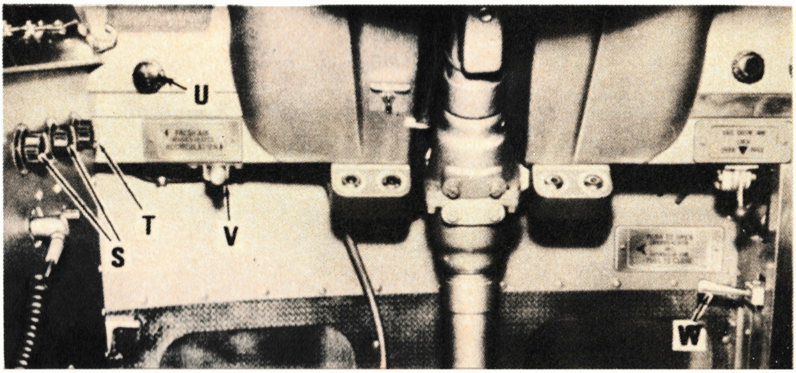
OPERATOR'S COMPARTMENT

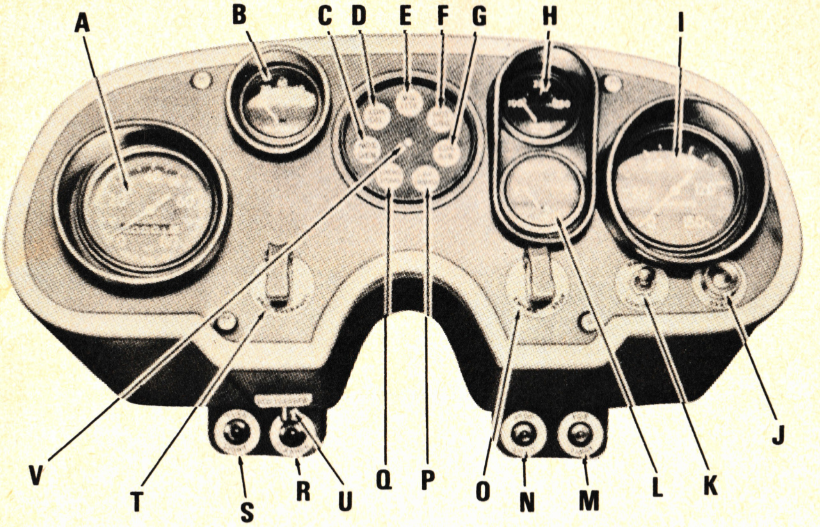


A.	SWITCH PANEL	See page 5.
B.	P.A. SYSTEM MICROPHONE	Used to address passengers.
C.	P.A. SYSTEM VOLUME CONTROL	Adjusts P.A. system volume.
D.	DIRECTIONAL SIGNAL SWITCH LEVER	Used to signal turns.
E.	HORN BUTTON	Sounds electric horn.
F.	INSTRUMENT PANEL	See Page 4.
G.	ENTRANCE DOOR CONTROL HANDLE	Opens and closes entrance door.
H.	WINDSHIELD WIPER CONTROLS	Control windshield wiper motors.
I.	ENTRANCE DOOR LOCK OVERRULE SWITCH	Releases door air lock if it fails to do so when door control handle is operated.
J.	ACCELERATOR PEDAL	Controls engine speed.



K.	BRAKE PEDAL	Applies service brakes
L.	GEAR SHIFT LEVER	Selects transmission gears.
M.	CLUTCH PEDAL	Engages and disengages engine clutch.
N.	FOG LIGHT SWITCH (if so equipped)	Operates fog lights.
O.	HEADLIGHT DIMMER SWITCH	Selects headlights high or low beam.
P.	SLOTTED FASTENER KEY	Opens all compartments closed with slotted fasteners.
Q.	AIR HORN VALVE	Sounds air horn.
R.	DRIVER'S HEATER WATER VALVE	Controls water flow to driver's heater and defroster.
S.	DRIVER'S HEATER/DEFROSTER FAN SWITCHES	Controls driver's heater and defroster fans.
T.	DASH LIGHTS	Controls instrument panel lights.
U.	WINDSHIELD WASHER CONTROL	Operates windshield washers.
V.	DRIVER'S HEATER AIR CONTROL	Selects fresh or recirculated air into driver's heater/defroster system.
W.	DRIVER'S HEATER/ DEFROSTER SELECTOR LEVER	Selects flow of air between driver's area and windshield.

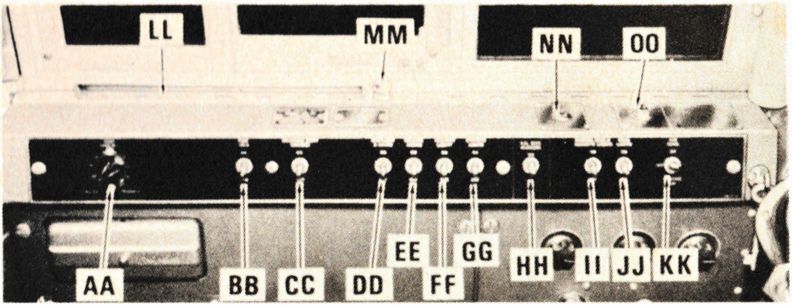
INSTRUMENT PANEL



A	SPEEDOMETER (or Tachograph)	Indicates vehicle speed.
B	OIL PRESSURE GAUGE	Indicates oil pressure.
C	"NOT GEN." TELL-TALE	Glows when generator not charging.
D	"LOW OIL" TELL-TALE	Glows when oil pressure too low.
E	"B.U. LITE" TELL-TALE (if so equipped)	Glows when back-up light is on.
F	"HOT ENG." TELL-TALE	Glows when engine overheated.
G	"LOW AIR" TELL-TALE	Glows when coach air pressure too low.
H	WATER TEMP. GAUGE	Indicates engine temperature.
I	AIR PRESSURE GAUGE	Indicates coach air system pressure
J	STARTER BUTTON	Engages starter.
K	MASTER CONTROL	Allows operation of engine and accessories when pulled out. Stops engine when pushed in.
L	FUEL GAUGE (if so equipped)	Indicates amount of fuel.
M	FOG LIGHT TELL-TALE (if so equipped)	Glows when fog lights are on.
N	STOP LIGHT TELL-TALE	Glows when both rear stop lights are on.
O	EMERG. STOP SWITCH	Stops engine if pushing MASTER CONTROL switch fails to do so.
P	"LAV. EMERG." TELL-TALE (if so equipped)	Glows if emergency buzzer in lavatory is pressed.
Q	"EMERG. BRAKE" TELL-TALE	Glows when emergency brakes are applied.

R	I.C.C. FLASHER TELL-TALE	Glows when I.C.C. flasher is on.
S	TURN LIGHT TELL-TALE	Flashes when turn signals are on.
T	ENG. OVERRULE SWITCH	Used to overrule automatic engine shutdown system if necessary to move coach to safety if automatic controls stop engine.
U	I.C.C. FLASHER SWITCH	Operates I.C.C. flasher.
V	HEADLIGHT HI-BEAM TELL-TALE	Glows when headlight hi-beams are on.

SWITCH PANEL



AA	HEAT CONTROL	Controls interior temperature
BB	FAST IDLE	Engages engine fast idle.
CC	SOLENOID SHIFT REVERSE	Engages reverse solenoid for shift into reverse gear.
DD	STEP LIGHT AND CHIME	Illuminates step light and allows use of passenger chime.
EE	READING LIGHTS	Allows passenger to turn on prefocused reading light.
FF	INDIRECT LIGHTS	Controls interior indirect lights.
GG	DRIVER'S LIGHT	Controls light above driver's compartment
HH	R.H. SIDE MARKERS (or back-up lights if so equipped)	Controls R.H. side markers (or back-up light)
II	MARKER, SIGN AND RUNNING LIGHTS	Controls exterior marker and destination sign lights.
JJ	HEADLIGHTS	Controls headlights.
KK	AIR COND/HEATING	Controls air conditioning and heating system.
LL	AIR DEFLECTOR	Directs air flow to driver or driver's window.
MM	VENT CONTROL KNOB	Opens or closes air vent.
NN	"HEAT ON" TELL-TALE	Glows when heating system operating.
OO	AIR CONDITIONING CAUTION LIGHT	Flashes or glows to indicate abnormal condition in Air Conditioning System.

ALARM SYSTEM

The coach is equipped with an alarm system of "TELL-TALE" lights and in some cases a buzzer signal which immediately warns the driver of any abnormal operating conditions. The "TELL-TALE" lights are located on or under the instrument panel in front of the driver.

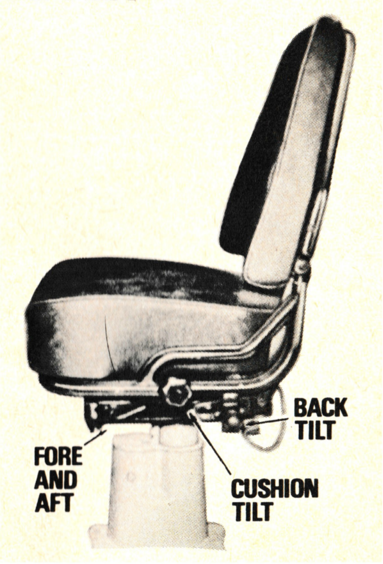
The following are the signals used to indicate various abnormal and other conditions.

TELL-TALE LIGHT	BUZZER	CONDITION
"LOW AIR"	Yes	Air pressure low
"HOT ENG."	Yes	Engine overheated
"LAV. EMERG."	Yes	Emergency in lavatory
"EMERG. BRAKE"		Emergency brake on
"LOW OIL"	Yes	Engine oil pressure low
"NOT GEN."		Generator not charging
"HI-BEAM"		Headlight high beam on
"FOG LIGHTS" (if so equipped)		Fog lights on
"STOP LIGHTS"		Both rear stop lights on
"B.U. LIGHT" (if so equipped)		Back up light on

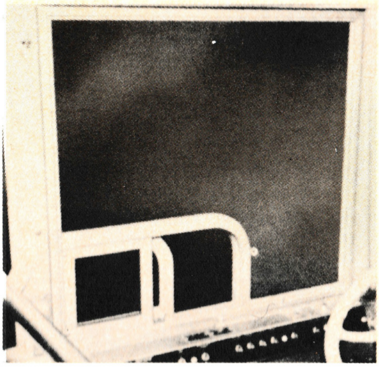
TO THE DRIVER

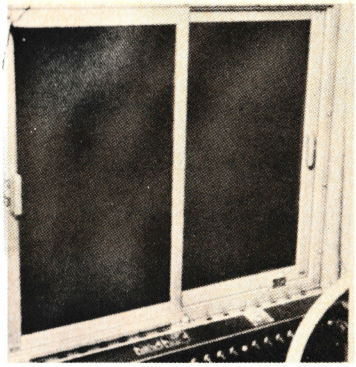
DRIVER'S SEAT

Driver's seat may be adjusted fore and aft by pushing in lock lever located at left front of seat. When seat is positioned, release lever. When seat is in either maximum fore or aft position, it may be moved an additional inch by lifting and pulling back or forth to engage a notch. The back of the seat cushion can be tilted up or down by grasping a large knob at left center of driver's seat and turning forward to lower and backward to raise. Seat may be raised by grasping and firmly pulling seat frame up. To lower, lower seat to lowest position, then raise to desired height.



DRIVER'S WINDOW


AIR CONDITIONED COACHES


NON-AIR CONDITIONED COACHES

In air conditioned coaches, the lower rear corner of the driver's window may be opened by sliding glass panel rearwards.

In non-air conditioned coaches the sliding window may be opened by sliding front section rearwards or rear section frontwards.

EMERGENCY ESCAPE

All side passenger windows can be opened from the inside for emergency escape purposes. Window sash is hinged at the top and can be opened by pulling out and up on the lower moulding, then pushing window sash out. Instruction plates are mounted below the sash at each seat location.

The rear center window can also be used as an exit. To open, pull up on bar at bottom of sash and push out on window.

ENTRANCE DOOR CONTROL

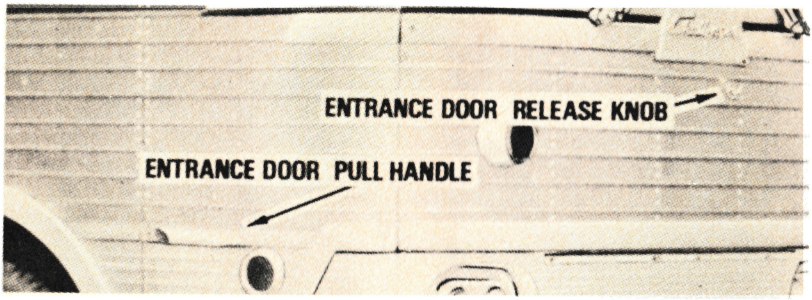
The entrance door is provided with an air-operated lock. The door is opened or closed by means of a door control handle on the dash to the driver's right. To open, turn handle clockwise; counterclockwise to close.

The air lock engages automatically when the door is closed, disengages to open.

In the event that the air lock mechanism does not release when an attempt is made to operate the entrance door handle, depress the overrule switch located under the dash near the center of the coach. This will release the air lock regardless of the position of the door control handle.

IMPORTANT

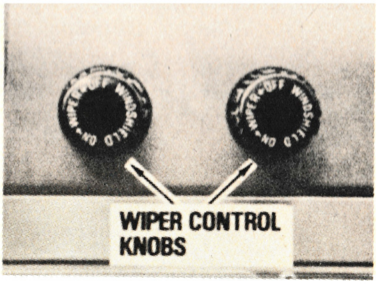
If air lock fails to engage when entrance door is closed,



immediately advise service personnel at next service stop. Do not attempt to engage while coach is in motion.

The entrance door can be opened from outside the coach by means of a release knob located below front windshield. After pushing release knob, pull door handle and open.

WINDSHIELD WIPERS



Two air-operated windshield wipers are provided, controlled by two small knobs at the center of the dash to the driver's right. Each knob controls the corresponding windshield wiper.

To operate wipers, turn control knob for wiper desired toward direction indicating "ON" until required speed is reached. To stop wipers, turn knob to "OFF" position.

Coaches equipped with air operated windshield washers have an independent washer control knob located on the dash to the left of the instrument panel.

To operate windshield washers, press control knob. The washers will operate as long as the control knob is held in this position. Turn windshield wipers on when using windshield washers. The windshield washer reservoir is located in the left front compartment below driver's floor.

TACHOGRAPH (IF USED)

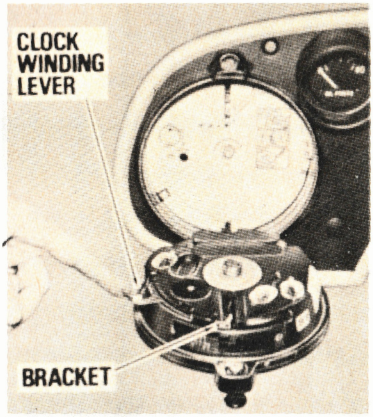
Some coaches are equipped with a Tachograph in place of the usual speedometer.

The Tachograph is a recording speedometer indicating driving speed, mileage covered and the time of day.

A flashing warning lamp near the top centre warns when a predetermined speed is exceeded.

The speeds driven, the driving and stopping periods and the mileage covered are simultaneously recorded on a wax coated diagram chart that is rotated by the instrument's clock movement.

WINDING CLOCK



Pull out lever on left of instrument and move it back and forth till it strikes the stop. Push lever back to usual position. Clock may be wound with chart in position.

CHANGING CHART

NOTE: It is most important that the Tachograph never be opened or closed while the engine is running or coach is in motion to avoid damaging the chart and the instrument.

The Tachograph is opened by inserting key in lock at top of unit and turning counter-clockwise.

Remove knob on chart holder by turning counter-clockwise and remove old chart. Place edge of new chart under the small bracket on the cover rim so that the center of the chart falls on the unit center post. Then rotate the chart, until the time of day as marked on the chart scale and shown by the visible clock, coincides with the left hand edge of the red mark on the outside of the instrument cover. Replace the chart holder and turn clockwise until the bayonet catch snaps into position. Make sure that the chart does not move while fastening the chart holder. A small wheel accessible when the instrument is opened, sets the clock to the correct time.

ENGINE OPERATION

Controls necessary to start and stop engine from the operator's compartment are mounted on the instrument panel in front of driver. These controls are:

"MASTER" switch: must be pulled out when starting engine. When switch is pushed in the engine will stop.

"STARTER" switch: is of the "MOMENTARY-ON" type, and must be held in the "START" position to engage the starter. When released, switch will return to "NORMAL" position.

"EMERGENCY-STOP" switch: is of the "MOMENTARY-ON" type used to stop engine if it fails to do so when the "MASTER" switch is pushed in. The switch must be pushed up to operate the emergency stop mechanism.

"ENGINE OVERRULE" switch: is of the "MOMENTARY-ON" type used to overrule the automatic engine shutdown system, in coaches so equipped, if necessary to move coach to safety if automatic controls stop engine.

"GAUGES AND TELL-TALE LIGHTS" Oil pressure and temperature gauges, together with "LOW OIL" and "HOT ENG." tell-tale lights, are located in instrument panel in front of operator. A buzzer when "HOT ENG." or "LOW OIL" tell-tale illuminates.

STARTING THE ENGINE

1. Make sure that the Parking Brake control button is pulled up, applying air-operated parking brakes.
2. Make sure the remote control switch in rear panel is set for front operation. Transmission shift lever should be in neutral position.
3. Pull " MASTER" switch to out position.

NOTE: When the "MASTER" switch is in the out position the "LOW OIL" tell-tale will light. "LOW AIR" tell-tale will light and buzzer will sound if air pressure is below 55-60 lbs. Lights will remain illuminated and buzzer will sound after the engine has started until oil pressure is over 11 lbs. and air pressure above 55-60 lbs.

4. Press "START" button to engage starter. Release button the instant engine starts.

CAUTION:

Do not engage starter continuously for longer than 15 seconds. Allow starter motor to cool for 10 or 15 seconds before a second attempt. Continuous use of the starter motor without allowing a cooling period may damage the starter unit.

5. Refer to "EMERGENCY CONDITIONS" for instructions regarding starting engine at rear of coach.

COLD WEATHER STARTING

The coach is equipped with a cold weather starting fluid cup, located on top of the engine blower housing. The cup may be reached by opening the rear motor compartment doors. If temperature is below 35 degrees F., it may be necessary to use starting fluid capsules. Use one 7 c.c. capsule at temperatures above zero, or two at lower temperatures. DO NOT USE MORE THAN TWO FLUID CAPSULES. To use capsule, lift cover of starting fluid cup, insert capsule, force down over pointed tube in cup and squeeze until all fluid enters cup. Remove capsule and discard. Start engine in the usual manner.

FIRE WARNING

Starting fluid used in the capsules is highly inflammable, poisonous and is an anaesthetic: Do not smoke while using or handling capsules, and keep away from flame or high temperatures. Avoid inhaling fumes produced by starting fluid.

DURING OPERATION

WARM-UP

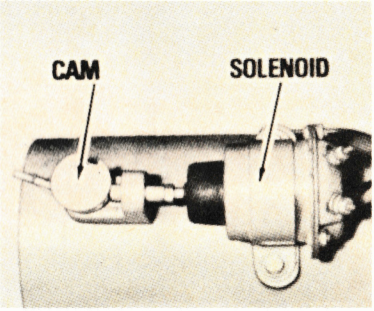
After starting the engine, operate it at a fast idle speed by engaging "FAST IDLE" switch on driver's panel. Make sure that air-operated parking brakes are applied during warm-up. Observe gauges and tell-tale lights frequently during warm-up and subsequent operation. If abnormal conditions develop as indicated by gauges and warning devices, stop engine immediately and determine cause.

STOPPING ENGINE

1. Apply parking brake and place transmission shift lever in neutral.
2. Idle engine for about 30 seconds, then push the "MASTER" switch to the "IN" position.

ENGINE EMERGENCY STOP

The "EMERG. STOP" switch on the instrument panel is provided for stopping the engine ONLY when pushing the "MASTER" switch to the "IN" position fails to stop the engine. When this switch is moved to the "ON" position, it energizes a solenoid which releases a cam on the engine air choke valve permitting it to close, shutting off the air supply to the engine.



IMPORTANT

When the "EMERGENCY STOP" switch has been used to stop the engine, the choke valve must be reset manually before the engine can be operated. See illustration above. Rotate cam until shoulder engages cam lock.

The emergency stop is to be used ONLY when pushing the "MASTER" switch fails to stop the engine. Do not re-start until the reason for loss of control has been corrected.

AIR PRESSURE

The brakes, air suspension system and other systems and controls of the coach depend on adequate air pressure for their operation. Air pressure in the coach air system is therefore extremely important.

After the engine has been started, "LOW AIR" tell-tale will light and buzzer will sound until air pressure is built up to 55-60 lbs. To assure safe braking, DO NOT MOVE COACH UNTIL AIR PRESSURE IS AT LEAST 90-100 LBS.

If during normal operation the "LOW AIR" tell-tale goes on and buzzer sounds indicating that air pressure is too low, stop the vehicle at once and determine reason for pressure loss.

ENGINE OIL PRESSURE

Engine oil pressure gauge is mounted on instrument panel in front of operator. Normal readings with engine hot are: IDLING: 11 lbs. minimum; GOVERNED SPEED: 30 lbs. minimum. Engine must not be operated when oil pressure falls below 30 lbs. at governed speed under full load. If oil pressure drops below a safe level, the "LOW OIL" tell-tale will light, buzzer will sound and automatic shut-off system (if so equipped) will stop the coach engine. Refer to "ALARM SYSTEM."

ENGINE TEMPERATURE

A gauge marked "WATER TEMP." is located on the instrument panel to indicate engine temperature. The most efficient operating temperature range is 170 — 185 degrees F. If possible, do not move the coach after starting a cold engine until temperature reaches at least 140 degrees F. If the engine overheats the "HOT ENG." tell-tale light on the instrument panel will light and warning buzzer will sound. If the coach is equipped with automatic shut-down system, the controls will stop the coach engine.

GENERATOR

A tell-tale light marked "NOT GEN." is located on the instrument panel to indicate when generator is not charging. With "MASTER" switch pulled out and engine not running or with engine running and generator not charging, this light will be illuminated. If the light goes on during normal operation, proceed as outlined later in this manual under "EMERGENCY CONDITIONS."

ENGINE ALARM SYSTEM

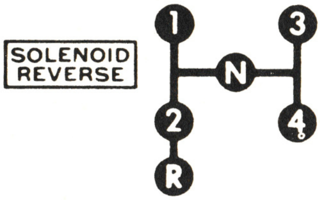
The engine is equipped with an alarm system to signal low oil pressure, low air pressure and high engine temperature. "LOW OIL" "LOW AIR" and "HOT ENG." tell-tales are located on the instrument panel. A buzzer sounds if any of these conditions occur. Some coaches have an automatic shut-off system inter-connected with the engine alarm system to shut off the engine in case of oil pressure drop or abnormal temperature rise. This feature is provided to prevent damage to the coach engine if either of these abnormal conditions arise.

The action of the automatic shut-down controls can be overruled, in order to move the coach to a safe location, by the use of the "ENGINE OVERRULE" switch located on the driver's instrument panel to the left of the steering wheel. To re-start the engine after automatic controls have stopped it due to overheating or loss of oil pressure, hold the "ENGINE OVERRULE" switch in the "ON" position and start the engine in the usual way. The switch returns to the "OFF" position when released. Under no circumstances should the engine be operated longer than is absolutely necessary after the engine has been stopped by the automatic shut-down controls.

USE OF TRANSMISSION

The transmission has four forward and one reverse speeds. A conventional shift lever located to the right of the operator's seat is used to select forward transmission gears. The shift into reverse gear is made by using the shift lever and an electric solenoid controlled by the "REVERSE" switch on the driver's switch panel.

Always start coach in motion at the lowest possible engine speed to prevent unnecessary clutch wear.



Close "Reverse" Switch For Shift Into Reverse Gear

REVERSE SHIFTING

The master switch must be in the "OUT" position before "REVERSE" switch will be operative.

To shift into reverse gear stop coach completely. Depress clutch pedal and, while holding the "REVERSE" switch in the "ON" position, move shift lever into the second gear position from the neutral position of the shift lever.

To shift out of reverse gear stop coach completely. With clutch pedal depressed, move gear shift lever into the neutral position.

It is not necessary to use the solenoid switch when shifting out of reverse.

CAUTION

Solenoid switch should be used only when gear shift lever is in neutral position, otherwise possible locking of gears may result.

UP SHIFTING

Always start the coach in motion using first gear, then change progressively into second, third and fourth. Do not skip gears.

Double-clutching is recommended when making each gear change. Remain in each transmission speed until the engine reaches full governed speed before shifting into the next highest gear.

DOWN SHIFTING

Double-clutching in downshifting is recommended. Always change to a lower gear to avoid engine "lug". Lower gears should be used in driving up or down grades, when operating in ice, snow or mud.

Lower gears should be used when going down grade in order to make use of the engine as a brake in controlling vehicle speed. The same transmission gear should be used to go down a grade as would be used in climbing it. However, the engine should never be allowed to operate at a speed higher than the maximum governed speed.

USE OF SERVICE BRAKES

The coach is equipped with air-operated brakes which are applied using the foot pedal to the left of the accelerator pedal. The amount of foot pressure applied to the pedal determines the extent of brake application.

The best braking action is obtained by making the initial application gradually to obtain the degree of braking required, then gradually reducing foot pressure as the speed of the coach is reduced, so that only slight pressure remains in the brake chambers at the end of the stop.

Stop lights on the rear of the coach are automatically applied when the brake pedal is depressed. A tell-tale light on the dash shows when both rear lights are functioning. If the tell-tale light does not go on when the brake pedal is depressed, check for faulty rear stop lights at once.

IMPORTANT

"Fanning" or "Pumping" the brake pedal is not recommended. This practice does not increase the effectiveness of the brake system, but wastes air and causes unnecessary wear on brake parts. Brake chamber and line pressure is not increased, instead reservoir and line pressure is reduced.

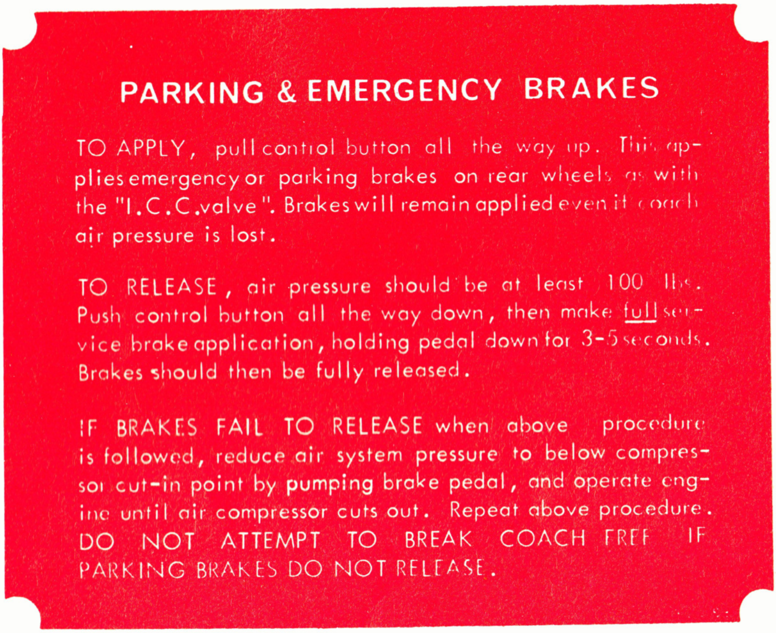
Before the brakes can develop their full effectiveness, coach air system pressure must be at least 90 - 100 lbs. Observe the air pressure indicated on the air pressure gauge at frequent intervals during operation. If the "LOW AIR" tell-tale light goes on and buzzer sounds, stop vehicle immediately and determine cause before proceeding.

If air pressure drops to a dangerously low level when air pressure warning devices are ignored, the air-operated parking and emergency brakes will apply automatically.

PARKING & EMERGENCY BRAKES

The coach is equipped with air-operated parking and emergency brakes. The control valve for parking and emergency brakes is located to the right of the driver's seat on a bracket attached to the grab rail. Operation of the system is as follows:

NORMAL OPERATION: The control valve button should be pushed in allowing service brakes to operate normally.



PARKING & EMERGENCY BRAKES

TO APPLY, pull control button all the way up. This applies emergency or parking brakes on rear wheels as with the "I.C.C.valve". Brakes will remain applied even if coach air pressure is lost.

TO RELEASE, air pressure should be at least 100 lbs. Push control button all the way down, then make full service brake application, holding pedal down for 3-5 seconds. Brakes should then be fully released.

IF BRAKES FAIL TO RELEASE when above procedure is followed, reduce air system pressure to below compressor cut-in point by pumping brake pedal, and operate engine until air compressor cuts out. Repeat above procedure. DO NOT ATTEMPT TO BREAK COACH FREE IF PARKING BRAKES DO NOT RELEASE.

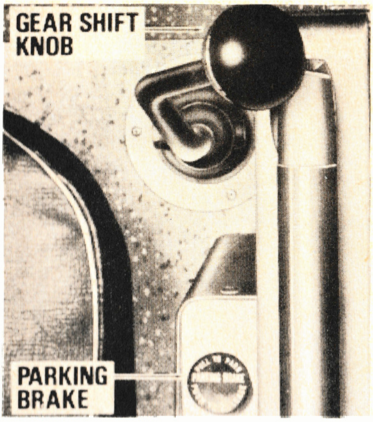
PARKING BRAKES: Pull control valve button all the way up. This applies rear wheel brakes until control valve button is pushed in.

EMERGENCY OPERATION: If normal application of service brakes fail to stop the coach, emergency brakes can be applied by pulling the control valve button all the way up. This procedure will produce a sudden, severe stop and should ONLY be used in an emergency.

LOSS OF AIR PRESSURE: A warning tell-tale light and buzzer will go on when air pressure drops below 55-60 lbs. If parking reservoir pressure should drop below 40 lbs., making coach operation unsafe, the parking and emergency brakes will automatically be applied. Cause of pressure loss should be corrected before further operation.

RELEASE OF PARKING BRAKE: Air pressure should be at least 100 lbs. Push control button all the way down, then make full service application, holding down for 3-5 seconds. Brakes should then be completely released.

IF BRAKES FAIL TO RELEASE when above procedure is followed, reduce air system pressure to below compressor cut-in point by pumping brake pedal and operating engine until air compressor cuts out. Then repeat normal parking brake release procedure.



USE OF LIGHTS

All interior and exterior lights except headlights can be illuminated with "MASTER" switch in either position.

HEAD LIGHTS

Headlights are controlled by a switch marked "HEAD LIGHTS" on the switch panel to the left of the driver. High or low headlight beam is selected by means of a floor-mounted dimmer switch. When high beams are on, a tell-tale light marked "HI BEAM" on the instrument panel will glow.

FOG LIGHTS (IF USED)

On some coaches sealed beam fog lights are installed behind the front bumper below headlights. When the headlight switch is in the "ON" position, a foot operated switch is used to operate the fog lights. When fog lights are on a tell tale light on the instrument panel marked "FOG LIGHTS" will glow.

LIGHT SWITCHES

STEP LIGHT & CHIME: Passengers can signal driver using pull cord-operated chime and entrance stepwell light will go on when door is opened only when this switch is in the "ON" position.

READING LIGHT SWITCH: Located on switch panel, energizes reading light circuit. Individual reading lights cannot be turned on by passengers unless the reading light switch is placed in the "ON" position.

INDIRECT LIGHTS: Indirect lights are controlled by switch marked "INDIRECT LIGHTS" located on the switch panel. Lights can be illuminated with master switch in any position.

DRIVER'S LIGHT SWITCH: On switch panel at left of operator. Controls light mounted above driver.

R.H. SIDE MARKER SWITCH: On coaches so equipped if required by vehicle regulations, controlling right-hand side approach marker lights.

BACK UP LIGHT SWITCH: Located on switch panel. Illuminates the back up lights on coaches so equipped.

MARKER, SIGN AND RUNNING LIGHT SWITCH: Illuminates all marker and destination sign lights.

LAVATORY LIGHTS: Closing and locking the lavatory door from the inside illuminates the ceiling and "OCCUPIED" sign lights. The lavatory night light is controlled by the marker lights switch.

BAGGAGE COMPARTMENT LIGHTS: Baggage compartment lights are illuminated automatically when any of the baggage compartment doors are opened.

DIRECTIONAL SIGNAL SWITCH: Turn indicator lights are controlled by a switch lever on the left side of the steering column. Moving this lever in the direction of the intended turn will operate the corresponding front and rear flashing signal lights. When turn lights are on, a tell-tale light will flash beneath the instrument panel to the left of the steering column.

I.C.C. FLASHER SWITCH: Located under the instrument panel flashes all turn lights simultaneously.

HEATING AND AIR CONDITIONING

The coach is equipped with a heating and air conditioning system. A three-position switch located on the driver's switch panel is used to select either heating or air conditioning system operation depending on outside temperature. Moving the switch to the "A/C" position will place the air conditioning system in operation. Moving the switch to the "HEAT" position will operate the coach heating system. In the "OFF" position, neither heat nor air conditioning is operative. The "MASTER" switch must be pulled out before either system will function.

The "HEAT CONTROL" knob located on the driver's switch panel to the left of the driver is used to select interior temperature within the range of 68° - 78° F. Once a temperature is selected, the system will automatically maintain this temperature within close limits.

An A/C signal light is located at the front of the driver's switch panel to the driver's left. A plate mounted at this point reads "CAUTION: If Signal Light Flashes or Stays on Continuously Switch A/C Off and Report Condition to Service Department". If this should happen, turn air conditioning system off and do not use until the cause of trouble has been located and corrected by service personnel.

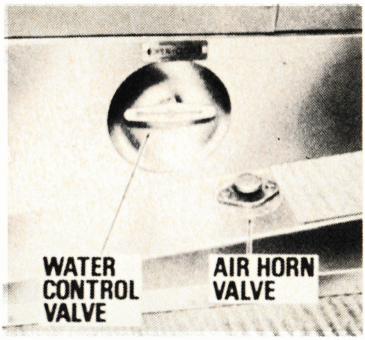
The flow of hot water from the engine cooling system to the heating and air conditioning system can be stopped in an emergency by the use of gate valves located in the engine compartment. See "ENGINE COOLING SYSTEM."

When it is necessary to operate air conditioning system with coach stationary, operate engine at fast idle by engaging the "FAST IDLE" switch on the driver's switch panel.

DRIVER'S HEATER AND DEFROSTER

A separate heater and defroster system is provided for the driver. This system is independent of the main heating system. Fans are controlled by two rheostat switches located below the driver's switch panel.

The flow of water to the driver's heater system is controlled by a manual driver's heater water control valve located at the driver's, left just above the floor. When the valve handle is in the horizontal position the valve is open; it is closed when the valve is turned clockwise to the vertical position. Partial flow can be obtained by moving the valve handle to an intermediate position.



A control located below the dash to the left of the instrument panel regulates the flow of fresh or recirculated air into the driver's heater system as required.

In the event of water valve failure or to isolate the engine cooling system, the flow of hot water to the driver's heater may be stopped by turning off a small gate valve located toward the rear of the engine at the left-hand side of the engine compartment.

The flow of air from the driver's heater and defroster blowers may be divided between the driver's area and the windshield as required by the use of a control handle located directly below the "ENTRANCE DOOR AIR LOCK OVERRULE" valve handle. Push handle to open driver's heater, pull to open defroster.

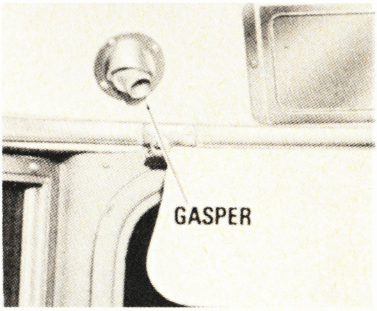
CAUTION

Avoid too high a temperature in the driver's area. This tends to induce drowsiness, affecting the operator's ability to operate the coach safely. It may also affect the temperature in the passenger compartment.

VENTILATION

The operator should always attempt to introduce as much outside air as possible without seriously affecting the operation of the heating or air conditioning systems. It should be remembered that outside air can only enter the coach if air is being exhausted. Also, the interior of the coach should be slightly pressurized to prevent dust and moisture from entering the vehicle.

When outside temperature is very high and maximum cooling is required, all adjustable intake and exhaust openings should be closed. This is also true in extremely low outside temperatures when maximum heating is needed.



Provision is made to introduce fresh air into the coach heating system. Certain controls are included to regulate the amount of fresh outside air supplied to the air distribution system. Air intakes are provided at each side of the vehicle below the windows through which outside air enters the blowers and is mixed with recirculated air. Fresh air can also be introduced through an adjustable intake in the driver's heater and defroster system.(See "DRIVER'S HEATER AND DEFROSTER")and through a "GASPER" located in the upper left corner of the driver's area above the windshield. An exhaust outlet, which can be adjusted only as a service operation, is located in the roof at the front of the coach.

ENGINE COOLING SYSTEM

The engine cooling system controls the operating temperature of the coach engine and also provides a supply of heated water for the coach heating system.

The filler cap is located on the right hand side of the coach at the rear above radiator compartment.

A water level test cock is provided in the engine compartment to determine whether system is full during initial filling, and to indicate the need for adding water.

Two gate valves are located in heater lines to separate the heating system from the engine cooling system. This feature is provided for emergency and maintenance purposes. The driver should make sure these valves are open if the system must be drained in an emergency. One valve is located at the right side of the motor compartment. The other is mounted near the transmission housing at the left side of the motor compartment.

REPLENISHING SYSTEM

If water does not flow from level cock, additional water is required.

Open water filler cap. With engine running, add water until it flows from open level cock. Close level cock. Close filler cap and tighten securely.

CAUTION

Cold water should never be poured into the cooling system when engine is hot. Wait until engine has cooled, then add water slowly with engine running.

DRAINING COOLING SYSTEM

If necessary to drain the system completely, such as to prevent freezing, the heating system must also be drained.

NOTE: If it is necessary to drain the cooling system to prevent freezing, the lavatory water tanks must also be drained. See draining instructions under "LAVATORY."

HEATING SYSTEM DRAIN POINTS

HEATER CORE DRAIN COCK: Open right front baggage compartment door and blower plenum chamber door to expose heater core. Open drain cock located at base of heater core.

DRIVER'S HEATER DRAIN COCK: Remove emergency equipment panel and open drain cock located inside and to the left of compartment. This will drain heater core and lines connected to heater core.

ENGINE DRAIN POINTS

DRIVER'S HEATER WATER LINE DRAIN COCK: Located below thermostat housing on left side of engine.

ENGINE OIL COOLER DRAIN PLUG: Remove drain plug located at bottom of cooler housing. This will drain engine oil cooler and partly drain water pump and engine.

SUCTION LINE DRAIN PLUG: Remove drain plug located in R.H. side engine compartment to drain the heater core suction line, surge tank, radiators and completely drain water pump.

COOLANT FILTER DRAIN PLUG (if so equipped): Located right rear engine compartment. Remove drain plug at bottom of filter.

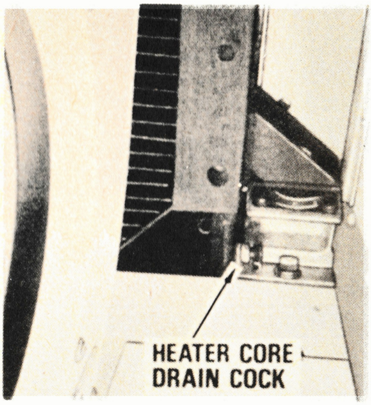
LAVATORY CHEMICAL AND WASTE WATER TANK DRAIN VALVE: Control located in Lavatory Service Panel. Move lever to right to close and to left to drain.

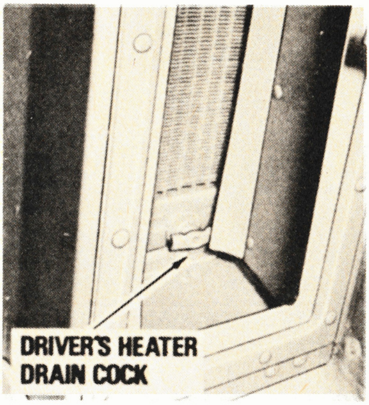
SINK TRAP AND FRESH WATER TANK DRAIN VALVES: Located in right upper rear of the engine compartment. To open turn valves counter clockwise and pull.

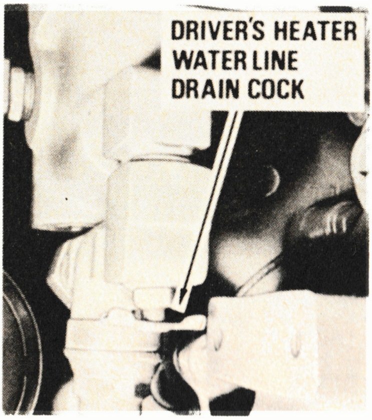
AIR COMPRESSOR: Located right side engine compartment. Remove drain plug.

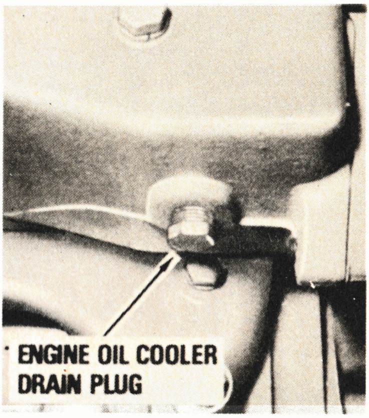
CENTRAL HEAT LINES DRAIN PLUG: Accessible through the L.H. side service compartment door. Remove drain plug located on feed line above engine mounting.

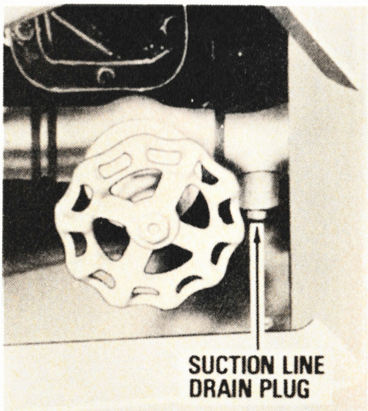
COOLING & HEATING SYSTEM DRAIN POINTS

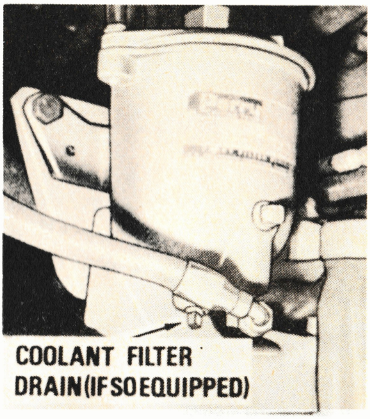

HEATER CORE
DRAIN COCK

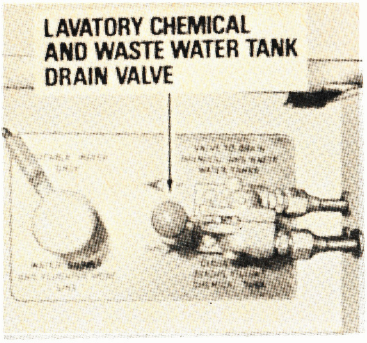

DRIVER'S HEATER
DRAIN COCK

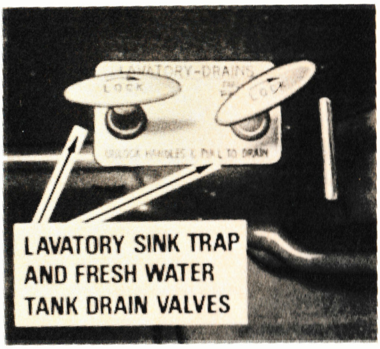

DRIVER'S HEATER
WATER LINE
DRAIN COCK

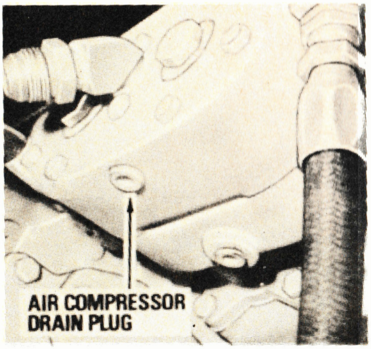

ENGINE OIL COOLER
DRAIN PLUG

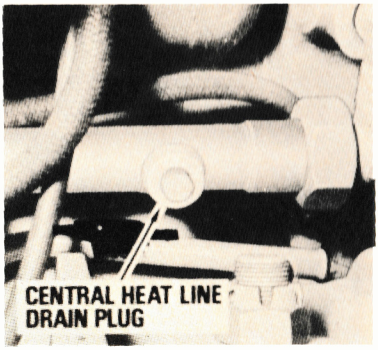

SUCTION LINE
DRAIN PLUG


COOLANT FILTER
DRAIN(IF SO EQUIPPED)


LAVATORY CHEMICAL AND WASTE WATER TANK DRAIN VALVE
VALVE TO DRAIN CHEMICAL AND WASTE WATER TANKS


LAVATORY-DRAINS
LOCK
LOCK
LAVATORY SINK TRAP AND FRESH WATER TANK DRAIN VALVES


AIR COMPRESSOR DRAIN PLUG


CENTRAL HEAT LINE DRAIN PLUG

FILLING EMPTY SYSTEM

Close drain cocks and make sure all drain plugs are installed. Fill surge tank with clean water or anti-freeze solution during cold weather until system is approximately half filled, then start engine and continue to fill system until full.

ENGINE CRANKCASE OIL

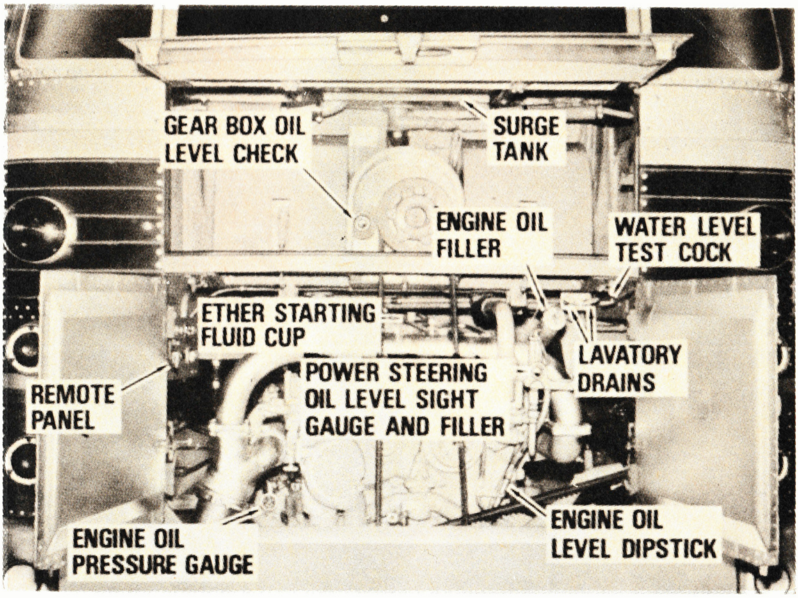
Engine oil dipstick is accessible through the rear motor service door. Oil fill is located at right hand side of engine.

Always check engine oil level with engine at normal operating temperature and with the coach in a level position.

CAUTION

Leave engine stopped for at least three minutes before checking oil level.

To open rear motor service door release lever aside at base


GEAR BOX OIL LEVEL CHECK
SURGE TANK
ENGINE OIL FILLER
WATER LEVEL TEST COCK
ETHER STARTING FLUID CUP
LAVATORY DRAINS
POWER STEERING OIL LEVEL SIGHT GAUGE AND FILLER
REMOTE PANEL
ENGINE OIL LEVEL DIPSTICK
ENGINE OIL PRESSURE GAUGE

of door and swing open.

Withdraw dipstick and wipe clean. Insert dipstick, then withdraw and note oil level. If down to "LOW" mark, sufficient oil must be added to bring level up to "FULL" mark. Add crankcase oil of proper grade and viscosity.

Sight gauges are provided for checking the oil level in the engine cooling blower gear box and the power steering fluid reservoir. Correct level is maintained when oil is at the center of the glass. Levels should be checked occasionally and fluid added if necessary.

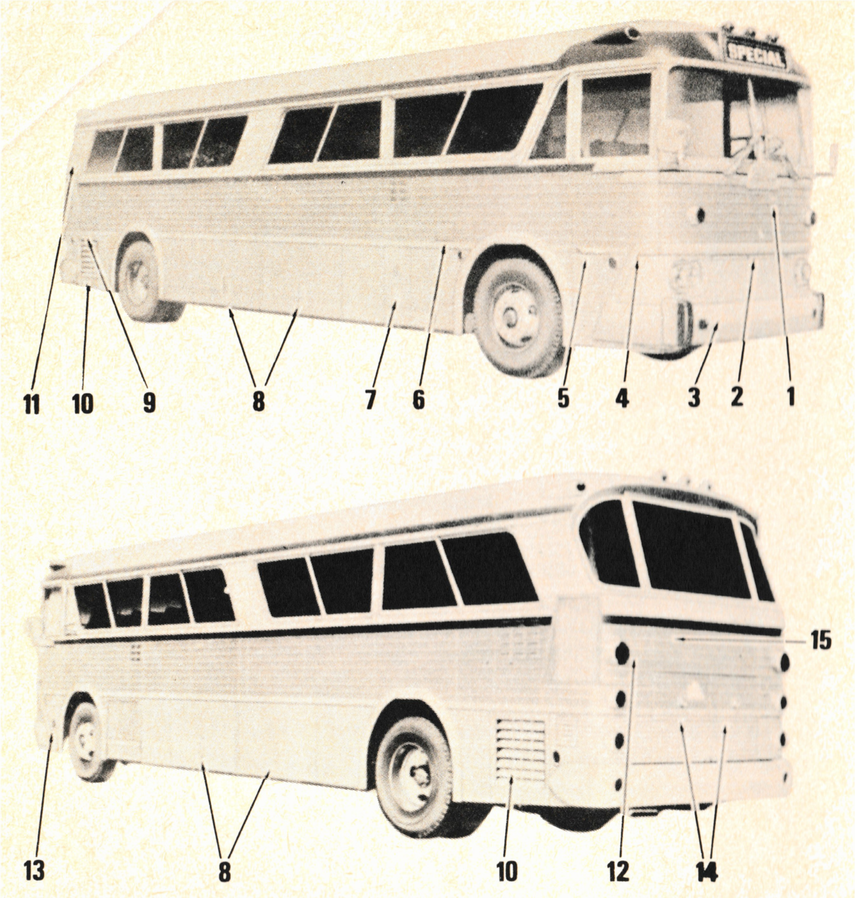
ENGINE FUEL OIL

The engine fuel oil tank filler is accessible through access door at right side of coach.

The fuel tank is equipped with a "VENTALARM" device. The Ventalarm whistles while tank is being filled and stops when tank is nearly full. Use only clean diesel fuel of the correct grade. Close fuel tank filler cap and tighten securely after filling.

EXTERIOR COMPARTMENTS

Exterior views on following page identify all exterior compartments and access doors. Use of small access doors is explained at various points in the manual. Method of opening main compartment doors follows:



1. Entrance door release knob
2. Front license plate location
3. Bumper and spare tire compartment door
4. Entrance door
5. Entrance door handle
6. Fuel tank filler door
7. Battery compartment door
8. Baggage compartment doors
9. Lavatory service panel door
10. Side motor compartment door
11. Cooling system filler door
12. Radiator door
13. Tool compartment door
14. Rear motor compartment doors
15. Blower compartment door

CONDENSER DOOR (AIR CONDITIONED COACHES ONLY)

Condenser door is located at left side of coach giving access to air conditioning condenser blowers and other components for service purposes only. It is fastened by four slot-type fasteners and is held in the out position by a hinged metal strap. Break lock on strap before closing door.

BAGGAGE COMPARTMENT DOORS

Insert fingers under latch handle, then pull out and up on handle to release latch. Raise door fully until locking pin can be inserted into hole on door prop. To close, remove locking pin from prop and lower door. DO NOT DROP BAGGAGE DOORS TO CLOSED POSITION. To lock, lift up on door latch, push door closed, and push latch down until it snaps into the closed position.

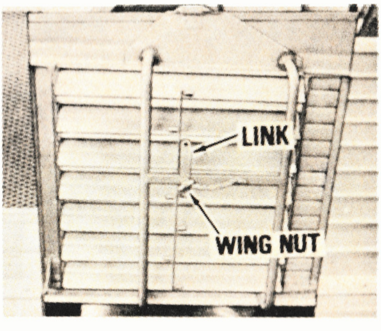
BATTERY COMPARTMENT

The battery compartment is located on the right-hand side of coach. Access is through a separate battery compartment door located behind the front wheelhousing. The door is secured by a spring type lock. Batteries are mounted on roll-out trays which are released by removing the brass capscrews.

SIDE MOTOR COMPARTMENT DOORS

Side motor compartment doors are located at the right and left rear corners of the coach. Access is gained by releasing the spring-type lock and pulling out and up. Raise door fully and engage hold-up props. To close, release hold-up prop and lower door until lock latches. These compartments provide access to right and left hand side of engine.

On later coaches, these doors are equipped with adjustable louvers which may be opened or closed depending on operating conditions. To open or close louvers, remove wing nut on inside of door and move link to desired position.



BLOWER COMPARTMENT

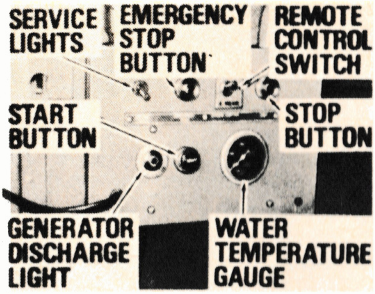
Blower compartment is located above motor compartment. Access is gained by first opening the rear motor service doors as explained, then pulling down on the three spring-type catches on bottom edge of door. Pull door out at bottom.

CAUTION

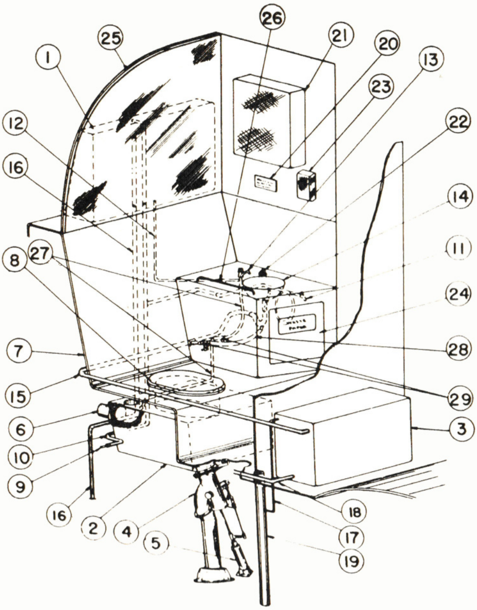
Checks should be made at regular intervals to be certain that the blower compartment door is closed securely. Serious loss of engine cooling capacity may result if the door is not properly latched.

REMOTE CONTROL ELECTRICAL PANEL

The remote control electrical panel used for rear operation of the engine is located in the motor compartment at the left-hand side. To gain access to the panel open rear motor compartment doors.


SERVICE LIGHTS
EMERGENCY STOP BUTTON
REMOTE CONTROL SWITCH
START BUTTON
STOP BUTTON
GENERATOR DISCHARGE LIGHT
WATER TEMPERATURE GAUGE

LAVATORY


26
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1	Fresh Water Tank
2	Chemical Waste Tank
3	Wash Basin Waste Tank
4	Drain Tube Assembly
5	Air Cylinder
6	Exhaust Fan & Motor
7	Lavatory Seat & Side Wall
8	Toilet Seat
9	Hansen Quick Connector
10	Fresh Water Tank - Fill & Flush Line
11	Hose & Nozzle Assembly - Flushing
12	Fill Line - Wash Basin
13	Faucet
14	Wash Basin
15	Wash Basin Drain Line
16	Over Flow Line - Fresh Water Tank
17	Over Flow Line - Waste Water Tank
18	Drain Line - Waste Water Tank
19	Floor Pan Drain
20	Name Plate
21	Towel Dispenser
22	Soap Dispenser
23	Deodorizer
24	Waste Paper Container
25	Mirror
26	Grab Rail
27	Faucet Drain Line
28	Sink Trap Drain Line
29	Drain Valves

Lavatory compartment, located at right rear of coach, contains a chemical toilet, wash basin with running water, waste paper container and mirror.

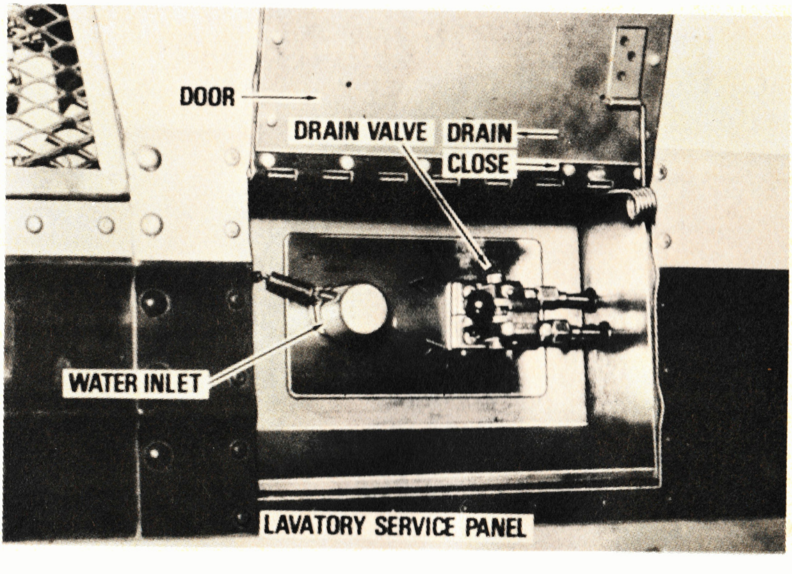
Lavatory compartment ventilation blower runs whenever "MASTER" switch is in the "OUT" position. Closing and locking door from inside illuminates the "OCCUPIED" sign on outside of door and illuminates ceiling lamp. Emergency buzzer switch used on some coaches is located on wall of compartment with clearly marked instruction plates. When emergency buzzer switch is depressed, lavatory tell-tale light on instrument panel illuminates and buzzer sounds.

In the event of engine or heating system failure in freezing weather, tanks must be drained to prevent damage from freezing. Valves necessary to drain tank are located in the rear motor compartment and are accessible when rear service doors are opened.

IMPORTANT

Servicing lavatory tanks must normally be accomplished where proper facilities are available. Draining instructions included in this book are for use only in case of an emergency requiring draining of tanks.

Before draining chemical waste tank (2), if at all possible, position coach over a receptacle or sewer inlet or other facilities to comply with local health regulations. To drain chemical waste tank and basin waste tank, open lavatory dump air cylinder control valve. This valve can be reached by opening the lavatory service panel door located above the right rear engine compartment door.



To drain fresh water supply if necessary in freezing conditions, locate water drain line valve control handle mounted in right engine compartment on plate marked "LAVATORY DRAINS". Lever marked "FRESH WATER AND SINK TRAP DRAIN" is turned to the left and pulled.

NOTE: After emergency drain, the lavatory should be serviced properly where suitable facilities are available before it is used again.

EMERGENCY CONDITIONS

OPERATION OF ENGINE AT REAR

Switches for starting and stopping the engine at the rear are mounted on switch panel at left side of motor compartment. Open rear motor service doors as directed under "ENGINE CRANKCASE OIL" for access to switch panel.

STARTING ENGINE AT REAR

IMPORTANT: Before attempting to start engine at rear of vehicle make sure transmission shift lever is in neutral and apply parking brake.

1. In operator's compartment place "MASTER" switch in the "OUT" position.
2. In motor compartment put "REMOTE CONTROL" switch in second position for rear control.
3. Push starter button to engage starter. Use the same precautions regarding use of starter as explained under "STARTING ENGINE".

CAUTION

If necessary to work on engine without engine running, place "REMOTE CONTROL" switch in "OFF" position. This breaks circuit to front and rear starter and prevents accidental starting of engine.

STOPPING ENGINE AT REAR

To stop engine at rear press button marked "STOP".

IMPORTANT

In emergency only, if "STOP" switch does not stop engine, push in "EMERGENCY STOP" switch to release air choke valve cam. Reset emergency stop after engine has stopped, as explained under "ENGINE OPERATION".

ENGINE OIL PRESSURE LOW

If during operation the engine oil pressure drops below a safe level, the "LOW OIL" tell-tale light on the driver's instrument panel will go on, and the warning buzzer will sound. If the coach is equipped with automatic shut-off controls, these controls will stop the engine. The automatic shut-off system can be overruled to move the coach to safety. See "ALARM SYSTEM".

ENGINE OVERHEAT

If engine becomes overheated during operation, the alarm buzzer will sound and the "HOT ENG." tell-tale will be illuminated. If coach is equipped with automatic shut-off system, the safety control relay will stop the engine. The automatic shut-off system can be overruled if necessary to move the coach to safety as outlined under "ALARM SYSTEM". If overheating takes place, check water level of engine cooling system as directed under "ENGINE COOLING SYSTEM" and for other possible causes.

GENERATOR NOT CHARGING

If, during normal operation, the "GEN" tell-tale light goes on, it indicates that the generator is not charging. Turn off all electrical accessories, except driving lights at night, to reduce electrical load on batteries, and obtain service attention as soon as possible.

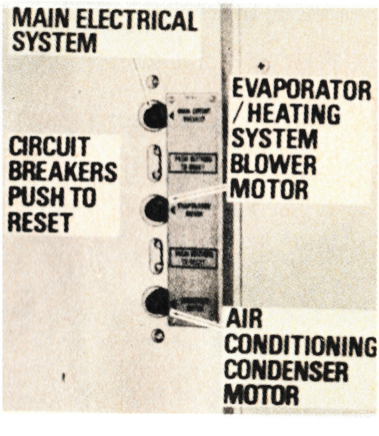
EMERGENCY FLASHING SIGNAL

The coach is equipped with a flashing signal system which flashes all directional signal lights simultaneously to warn traffic in an emergency. The I.C.C. flasher switch mounted under the instrument panel to the left of the steering column is used to energize this signal system. A tell-tale light below the switch flashes when the system is operating.

CIRCUIT BREAKERS

All electrical circuits are protected by circuit breakers. The main circuit breaker and two large circuit breakers protecting the air conditioning system blower motors are located at the front of the baggage compartment and can be reached through the left front baggage door.

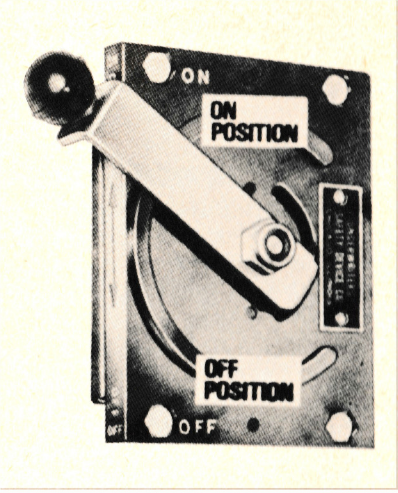
These large breakers must be manually reset, if they open, by pressing the button.


MAIN ELECTRICAL SYSTEM
EVAPORATOR /HEATING SYSTEM BLOWER MOTOR
CIRCUIT BREAKERS PUSH TO RESET
AIR CONDITIONING CONDENSER MOTOR

Smaller circuit breakers of the self-resetting type are located in the junction panel to the left of the operator's compartment. When one of these circuit breakers opens due to a shorted circuit, it will automatically reset itself when the breaker element cools. As long as the short exists, the breaker will continue to open and close intermittently. In this case turn the defective circuit off, if possible, until the cause can be located and corrected.

BATTERY DISCONNECT

A main battery disconnect switch is provided to shut off all electrical supply from the batteries. The switch is located at the right front corner of the baggage compartment and can be reached through the right front baggage compartment door. To disconnect batteries, pull knob down to "OFF" position.



IMPORTANT

Gauges and tell-tale lights are provided so that the operator can observe the operation and condition of various components and equipment. If abnormal conditions are indicated, TAKE ACTION AT ONCE to locate and correct the cause before serious damage can occur. DO NOT IGNORE warnings of abnormal operating conditions. During operation, regularly check all gauges and tell-tale lights.

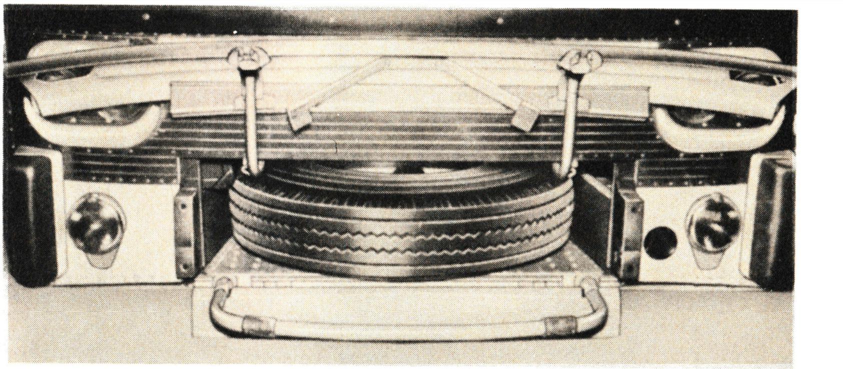
TOOLS AND SAFETY EQUIPMENT

Standard vehicle tools may be carried in a container or tray in either the left front compartment below the driver's floor or in the rear motor compartment at the right side as determined by company requirements.

The hydraulic jack is located in the spare tire compartment. Make sure tools are kept in containers provided, and that no tools are left loose in compartments.

Fire extinguisher, emergency axe and first aid kit are mounted inside the front dash compartment. Types and mounting of safety equipment vary with company requirements.

SPARE WHEEL AND TIRE



Spare wheel and tire are carried in a compartment immediately behind the front bumper. Access is gained by unscrewing retaining bolts located directly beneath the bumper with the wheel wrench, then pulling bumper out and up. Bumper will lock in the open position.

Make sure that both retaining bolts are tightened firmly after closing compartment door.

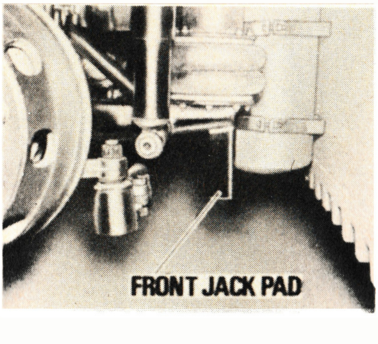
CHANGING WHEELS

USE OF RUN-UP BLOCK AND JACK

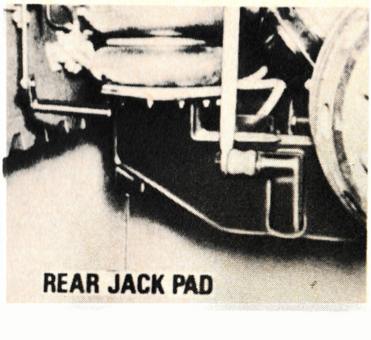
TO CHANGE FRONT WHEEL: Place the wooden run-up block in front of the deflated tire and drive coach onto the block. Apply parking brakes. Position jack under front jack pads and jack up coach. Remove run-up block and change wheel.

TO CHANGE OUTSIDE DUAL: Place wooden run-up block in front of the **inside** dual. Drive coach onto run-up block. Apply parking brakes then change wheel.

TO CHANGE INSIDE DUAL: Apply parking brakes. Position jack under rear jack pad. Jack up axle and change wheel.



FRONT JACK PAD



REAR JACK PAD

LIGHT BULB DATA

All bulbs used in the coach are 24 - volt. Do not attempt to replace with 12 - volt components.

EXTERIOR LIGHTS	NUMBER	QTY.
Fog Lights	1271	2
Headlights - Inner	4619	2
Headlights - Outer	4624	2
Turn Signal Lights	1203	4
Side Turn Signal Lights	1203	2
Stop Lights	1203	2
Destination Sign Lights	1691 IF	5
Tail Lights	623	2
Rear License Plate Lights	623	2
Center Marker Lights	1251	6
Corner Marker Lights	1251	4
INTERIOR LIGHTS		
Lavatory Main Light	1638	1
Lavatory Night Light	1495	1
Reading Lights	1691 IF	36
Driver's Light	1203	1
Indirect Lights	1691 IF	20
Aisle Lights	1251	4
Instrument Panel Lights	313	3
Tachograph Lights	15617	2
Step Light	623	1
Baggage Comp. Lights	1203	4
Engine Comp. Lights	623	2
Running Lights	1251	2
TELL-TALE LIGHTS		
Heat On	1450	1
Air Conditioning	313	1
Low Oil	313	1
Not Generating	313	1
Emerg. Brake	313	1
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